Management System Weaknesses

Analysis of facility-specific, site-specific, and generic vulnerabilities identified during this review indicates several weaknesses in **DOE's** overall approach to chemical safety or to particular management systems that contribute to the perpetuation of these vulnerabilities. Management systems provide the structure to facilitate the development, implementation, and oversight of effective chemical safety programs. In practice, these systems consist of policies, programs, and procedures used with such functions as planning, human resources management, training, oversight, information management, scheduling and budgeting, communications, risk management, quality assurance, and project management. If the vulnerabilities and management system weaknesses discussed in this report do not receive prompt and sustained management attention, they could lead to serious chemical safety incidents as the DOE complex continues to age and as cleanup, restoration, and **D&D** activities increase. Mitigation of the consequences of facility-specific, site-specific, and generic vulnerabilities and prevention of their recurrence will require effective implementation of management response plans and dedicated efforts to improve the efficiency of these management systems.

These systems consist of policies, programs, and procedures used with such functions as planning, human resources management, training, oversight, information management, scheduling and budgeting, communications, risk management, quality assurance, and project management.

Emphasis on, Commitment to, and Implementation of Chemical Safety Programs

Programmatic Weaknesses. Many physical deficiencies and programmatic weaknesses result in part from an overall lack of management emphasis on, commitment to, and strategic planning for chemical safety. This is evidenced by the priority accorded to chemical safety issues, by the diffuse nature of documented requirements and the inadequate nature of guidance provided, and by inadequate consideration of chemical safety in strategic and program planning.

Priority Accorded to Chemical Safety. The most serious concern arising from inadequate management attention to chemical safety is the relatively low priority assigned to chemical hazards

relative to other hazards of comparable consequence (e. g., nuclear hazards). DOE Headquarters has not issued an official policy statement on its commitment to chemical safety. At most sites, neither DOE nor contractor-management has undertaken the necessary initiatives to develop, implement, and promote well-defined and readily understandable programs for chemical safety that raise the rigor and emphasis of chemical safety programs to the level required for nuclear safety.

Four Major Management Weaknesses

* **Inadequate emphasis, commitment, and implementation**
. **Poor management of aging facilities**
. **Gaps in transition process**
• **Inadequate budget decision making for chemical safety**

The Office of Environment, Safety and Health has established a program to address DOE facilities with large chemical inventories (i. e., exceeding defined threshold quantities) that are regulated by OSHA under 29 CFR 1910.119, "Process Safety Management of Highly Hazardous Chemicals." DOE has developed standards and training based on the requirements of this regulation. Figure 5 describes the process for implementing a process safety management program. However, facilities not covered (i.e., those using less than threshold, but nonetheless significant, quantities of chemicals) require further direction, guidance, and assistance from DOE Headquarters. Overall, the existing DOE Headquarters program is not well coordinated with other related DOE safety programs and initiatives. At present, the program represents a staff commitment of less than one full-time equivalent per year.

Requirements and Guidance. Departmental requirements for chemical safety are scattered throughout a number of DOE Orders and Federal regulations, and no "roadmap" of chemical safety requirements is available to facilitate their application to site activities. (See Figure 6 for a list of requirements and guidance documents.) Consequently, different elements of contractor organizations are managing various components of chemical safety, resulting in fragmented chemical safety programs—particularly at large DOE sites. In general, the lack of clearly articulated chemical safety policy, requirements, and guidance from DOE Headquarters has contributed to the absence of comprehensive chemical safety programs at DOE sites.

Strategic and Program Planning. Strategic goals related to improvements in chemical safety are not readily apparent in DOE-wide strategic planning documents. In addition, most

PROCESS SAFETY INFORMATION	Maintain complete and accurate information on the process technology, process equipment, and hazardous characteristics and physical properties of all chemicals and intermediates for all covered processes.
PROCESS HAZARD ANALYSIS	Perform Process Hazard Analyses to identify and assess process hazards for each covered process.
PRE-STARTUP SAFETY REVIEW	Establish a procedure and perform pre-startup safety reviews for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information
MECHANICAL INTEGRITY	Ensure the integrity and safe operation of process equipment through inspection, testing, preventive maintenance, and quality assurance.
TRADE SECRETS	Ensure all information is available to support the Process Safety Management (PSM) Rule. When necessary, confidentiality or nondisclosure agreements may be used.
EMPLOYEE PARTICIPATION	Ensure that workers are consulted and have access to information regarding all elements of the PSM program,
SUBTIER CONTRACTOR SAFETY	Ensure that the level of safety is not compromised by subtier contractor operations on or in the vicinity of a process using highly hazardous chemicals,
TRAINING	Establish and implement a training program for all employees involved in operating a covered process. The program must include both initial and refresher training and provide a means of determining successful completion,
MANAGEMENT OF CHANGE	Establish and implement written procedures to manage changes (except for “replacements in kind”) to process chemicals, technology, equipment, and procedures and to manage changes to facilities that affect a covered process.
OPERATING PROCEDURES	Develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process. Procedures should address operating limits, safety and health considerations, safety systems, and their functions.
NONROUTINEWORK AUTHORIZATIONS	Ensure that appropriate measures are taken any time nonroutine operations are performed on or near covered process areas that might initiate or promote a release.
COMPLIANCE AUDITS	Ensure that the PSM program is operating in an integrated and effective manner in compliance with PSM requirements.
EMERGENCY PLANNING RESPONSE PLANNING	Establish and implement an emergency action plan for the entire plant that is in compliance with 29 CFR 1910.38(a) and that also addresses small releases.
INCIDENT INVESTIGATION	Establish a written incident investigation procedure that requires a team investigation of any incident that results in, or could reasonably result in, a catastrophic release of a highly hazardous chemical, The procedure must require a written report and establish a system to promptly address and resolve any report findings and recommendations.

Figure **5. Overview of Process Safety Management Elements**

FEDERAL REGULATIONS

29 CFR 1910.119	Process Safety Management of Highly Hazardous Chemicals
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1910.1200	Hazard Communication
29 CFR 1910.1450	Occupational Exposure to Hazardous Chemicals in Laboratories
40 CFR 68	Risk Management Programs for Chemical Accidental Release Prevention (Proposed Rule)
40 CFR 260-265	Resource Conservation and Recovery Act
40 CFR 355	Emergency Planning and Notification
40 CFR 700-799	Toxic Substances Control Act

DOE GUIDANCE

DOE 5400.1	General Environmental Protection Program
DOE 5480.10	Contractor Industrial Hygiene Program
DOE 5480.3	Safety Requirements for Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Wastes
DOE 5480.4	Environmental Protection, Safety, and Health Protection Standards
DOE 5480.19	Conduct of Operations Requirements for DOE Facilities
DOE 5480.23	Nuclear Safety Analysis Reports
DOE 5481.1 B	Safety Analysis and Review System

Figure 6. Requirements Governing Chemicals and Chemical Wastes at DOE Facilities

site-specific strategic and program planning efforts do not adequately address long-term goals for programmatic improvements and reduction in chemical inventory and usage.

Implementation Weaknesses. As a result of these weaknesses, chemical safety programs are often poorly articulated or defined, have not been integrated with other safety functions, and are neither fully implemented nor consistently applied across DOE sites.

These weaknesses indicate a general lack of emphasis on and attention to the dangers posed by hazardous chemicals and chemical wastes at DOE sites.

Program Definition. Chemical safety is not addressed as a separate, identifiable element of ES&H programs at DOE sites. At most sites, there is no clearly articulated policy or direction for chemical safety, and as a result, chemical safety is not uniformly identified as **a priority function. This weakness contributes** to the absence of implementing criteria or standards for handling hazardous chemicals; lack of requirements, guidance, or management expectations regarding handling, storage, and disposition of hazardous chemicals; lack of consistency for handling and storing hazardous materials at facilities within the same site; and lack of consistent development and implementation of site chemical safety program elements. Collectively, these weaknesses indicate a general lack of emphasis on and attention to the dangers posed by hazardous chemicals and chemical wastes at DOE sites.

Program Integration. At many DOE sites, chemical safety programs are not integrated effectively with other safety programs such as hazards analysis, emergency management, waste management and regulatory compliance, work control, and configuration management. Lack of integration between programs related to chemical safety and those for other safety issues at DOE sites can be attributed to several factors. DOE priorities (and their implied impact on resource allocation) emphasize analysis of nuclear hazards over chemical hazards—even when chemical hazards present comparable potential consequences. Further, the defined scope of required hazards analyses in DOE Orders has been incorrectly interpreted to preclude many chemical operations in nonnuclear systems, and the widespread inappropriate use of the “graded approach” to identify systems receiving funds for safety analyses does little to encourage the mitigation of hazards associated with chemical systems.

Hazards analyses (i.e., the evaluation of operational risks associated with processes, equipment, and measures to control such risks) are not applied consistently to chemical systems, particularly when chemicals are introduced or proposed for new uses. Many DOE sites and facilities assessed for this review do not have adequate management systems to analyze processes or equipment for chemical hazards or to prepare and issue formal "hazards analyses (e. g., Savannah River, Hanford, Sandia, and Brookhaven). Requirements for formal risk-based hazards analyses for purely chemical operations are not always clearly defined by DOE and implemented by site contractors. When hazards analyses are performed for chemical operations, these efforts often lack sufficient rigor and formality or indicate that personnel assigned to prepare and review hazards analyses are not adequately trained. (See Unanalyzed Hazards, p. 20.)

When hazards analyses are performed for chemical operations, these efforts often lack sufficient rigor and formality.

Emergency management functions are not consistently coupled with chemical safety activities. At some sites (e. g., Idaho National Engineering Laboratory and Lawrence Livermore), analyses to determine emergency action levels, which are used to establish the extent and scope of emergency planning and preparedness activities, are missing. Facility-specific emergency response plans are not always coordinated with planned responses to sitewide emergency situations, and planned responses to similar emergencies often vary among contractors at the same site. (See Unanalyzed Hazards, p. 20.)

Waste management activities tend to emphasize functions supporting compliance with RCRA requirements without according sufficient consideration to chemical safety concerns. DOE field and contractor management attention and focus on requirements carrying financial penalties for nonresponse may not be sufficient to provide effective integration of activities associated with protecting worker health and safety from chemical hazards. For example, at Rocky Flats the plutonium aqueous recovery system located in Building 371 was shut down in 1984, but recoverable plutonium (as plutonium nitrate) was left behind in tanks and ancillary piping. These recoverable products were declared by court order to be RCRA-regulated waste. RCRA requires daily inspections of tanks and ancillary piping in which hazardous waste residues are not provided with secondary containment. The Plant Operation Safety Program requires preparation of operational safety analyses for all work activities (whether RCRA related or non-RCRA related) in which a potential for exposure to toxic chemicals exists. A strategy that

Where chemical safety is concerned, work controls are not adequate for managing maintenance and construction activities.

meets RCRA requirements while minimizing worker exposures to chemical and radiological risks has not been implemented. **(See** Abandoned and Residual Chemicals, p. 41.)

Where chemical safety is concerned, **work *controls*** are not adequate for managing maintenance and construction activities. For example, in multiuser laboratory facilities at Sandia, the presence of several operations, maintenance, or construction organizations—all of which function independently—leads to confusion over responsibilities. As a result, workers are not always aware of chemical hazards associated with adjacent operations. In the event of a process upset, equipment failure, or inadvertent hazardous chemical release, personnel may not be properly protected or may be unable to respond properly.

In aging DOE facilities or laboratories, poor ***configuration management practices*** in the past have resulted in less-than-adequate documentation of chemical residues. The absence of full-system engineering evaluations during design modifications has led to an elevated incidence rate of breakdowns for support systems. For example, a number of small-scale ventilation modifications have been made over the past several years to support the needs of the multiuser laboratory complex at Sandia. These modifications have expended available excess capacity of ventilation systems, which in turn has resulted in excessive exhaust flow rates and significant air imbalances in the laboratories. If essential ventilation and other support equipment fails in service, there is a potential for exposure of laboratory personnel to hazardous chemicals. Previous exhaust system failures have resulted in pressure reversals, causing not only the loss of chemical vapor control, but the distribution of chemical vapors to other parts of the laboratory complex. At Savannah River, poor configuration management practices in the past have contributed to a lack of knowledge regarding chemical residues in the 412-D Heavy Water Extraction Facility and the 184-P Power House. (See Abandoned and Residual Chemicals, p. 40.)

Program lmrplementation. Incomplete and inconsistent implementation of chemical safety programs is manifested in a number of areas, including hazards communications, planning, training, timing of program implementation, and latitude in interpretation of guidance. The principal weaknesses in the area of hazards communications involve the limited availability of material safety data sheets and inaccurate or out-of-date labeling for

some hazardous chemicals at some sites. Planning weaknesses include limited consideration of chemical safety issues when facilities are being designed and constructed, as well as lack of a strategic perspective for the use of hazardous chemicals. Employee training is either not consistently provided or is not verified as complete before allowing employees to enter work areas containing hazardous chemicals. Moreover, not all hazardous work environments have been evaluated to determine whether facility-specific chemical hazards training is required. Some crucial program documents have not been prepared in a timely manner (e.g., a chemical hygiene plan) and other documents do not exist at some DOE sites (e.g., a chemical process safety management plan), further enhancing the likelihood that an overall chemical safety program has not been consistently implemented. Where site policy and standards exist, they may be applied as standards or as discretionary guidance. In the final analysis, DOE field and contractor management's tolerance for the flexible interpretation of policies and standards governing chemical safety practices and programs precipitates a variety of actions that are sometimes contradictory.

Management of Aging Facilities

DOE has a significant number of aging operational facilities involved in storing or processing chemicals. (See Table 4 for a listing of the average age and relative size of various categories of DOE facilities.)

Many aging facilities represent chemical safety vulnerabilities for one or more of the following reasons:

- **physical structures, support systems, and equipment have deteriorated rapidly because of their insufficient maintenance priority;**
- **aging facilities and equipment are sometimes being used for purposes for which they were not designed or equipped; and**
- **chemical handling practices currently in use do not meet regulatory and departmental requirements.**

Table 4. **Summary of Age and Square Footage of Selected Types of DOE Facilities**

Use	Number of Buildings	Weighted Average Age	Gross Square Feet	Net Occupiable Square Feet
Hazardous/Flammable Storage	200	23	435,365	381,275
Production/Manufacturing Bldgs	139	28	2,295,267	1,755,256
Production/Manufacturing Bldgs (Nuclear)	18	42	484,224	407,227
Hazardous Production/Manufacturing Bldgs	7	19	36,891	26,941
Fabrication Facilities	73	42	4,216,090	3,497,697
Fabrication Facilities (Nuclear)	5	35	566,809	337,600
Assembly Facilities	55	26	1,192,408	1,049,410
Assembly Facilities (Nuclear)	13	7	224,570	182,765
Manufacturing/Production-Related Labs	70	36	1,214,654	944,124
Materials Handling or Process Facilities	85	32	550,830	439,242
Nuclear Chemical Process Facilities	70	29	2,443,929	1,492,280
~ Nuclear Waste Process and/or Handling Bldgs	66	31	660,757	474,285
Other Industrial Facilities	136	38	960,447	744,082
Maintenance Shops, General	312	32	4,415,176	3,848,187
Paint Shops	21	22	61,634	54,338
Machine Shops	103	38	2,947,922	2,266,013
Work in Process/Ready Bldgs	8	31	48,254	42,253
Chemistry Laboratories (Nonnuclear)	42	36	853,181	532,900
Chemical Laboratories (Nuclear)	25	31	1,201,415	847,986
Other Chemistry Laboratories	18	36	270,117	205,043
Hot Cells	18	35	553,531	377,549
~ Laboratories, General (Nonnuclear)	68	26	1,346,349	1,016,808
~ Laboratories, General (Nuclear)	42	29	1,061,063	789,460
~ Multifunction Research/Lab Bldgs	54	32	3,490,871	2,183,664

~ NOTE: The weighted average age for all DOE facilities is 31 years.

These weaknesses, if not addressed, could result in an increased risk to workers, the public, and the environment as the condition of aging facilities continues to deteriorate. In addition, similar consequences can be expected in newer DOE facilities as funding for their missions is reduced or eliminated.

Maintenance Priority. Many aging facilities have not received sufficient maintenance because effective systems to ensure that they are minimally maintained are lacking and because maintenance budgets are declining. Predictive, preventive, and corrective maintenance programs are not fully implemented and, thus, have not been effective in minimizing or eliminating the deterioration of facility physical structures or support systems and in decreasing overall maintenance backlogs. There has been an increased reliance on administrative controls, rather than on well-maintained engineered systems, to prevent or mitigate conditions involving chemical hazards. For example, the Building 222 Chemistry Laboratory at Lawrence Livermore has a roof system and mechanical equipment that are deteriorating. Repair activities for the roof system and the mechanical roof-mounted equipment are frequent and extensive. Maintenance personnel can perform necessary modifications as long as strict administrative controls are followed to prevent researchers from venting noxious gases from individual laboratory fume hoods.

Facilities are not funded at safe maintenance levels or for safe standby while they await new missions or D&D.

DOE has not effectively addressed management of its facilities throughout their life cycle—from design, construction, and operation through transition to D&D. Having completed their missions, these facilities are not funded at safe maintenance levels or for safe standby while they await new missions or D&D. The physical structures of many such facilities have deteriorated significantly. Use of poorly maintained, aging facilities in this manner could decrease the margin of protection provided to workers and the environment from chemical hazards.

Design and Equipment. At some aging facilities, hazardous chemical wastes are being housed in structures not designed or equipped for that purpose. This practice has created an increased potential for worker exposures and environmental releases of hazardous materials and creates an overreliance on administrative controls rather than placing emphasis on engineered systems. (See Maintenance Priority above.) At Brookhaven, the Hazardous Waste Management Facility lacks appropriate engineering controls for repackaging hazardous materials. Repackaging is often performed by operators who

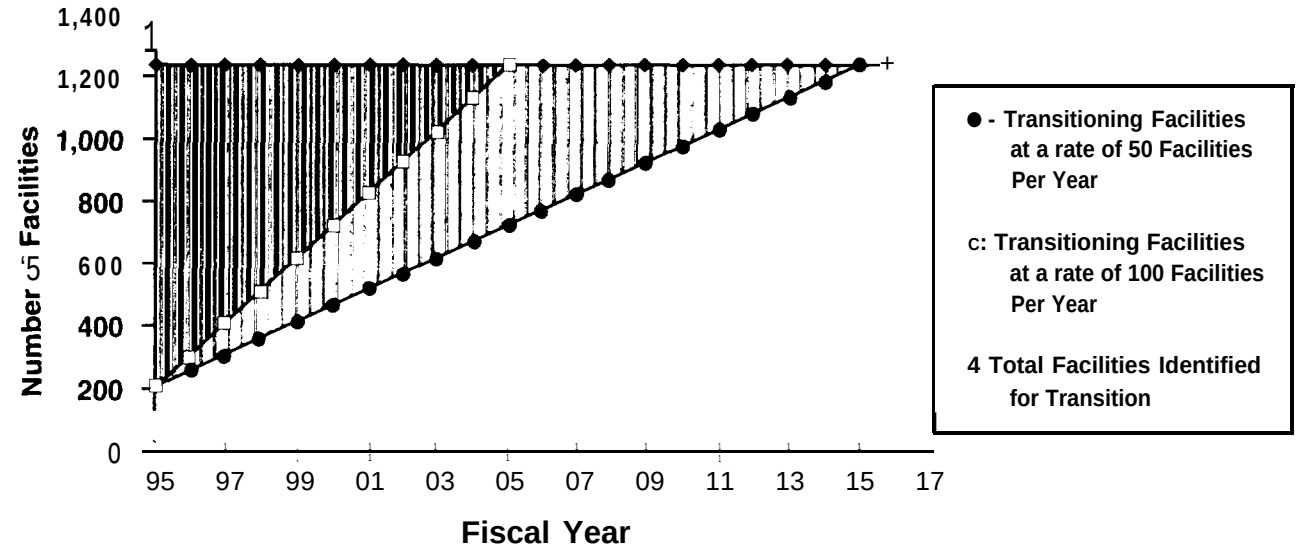
have to wear personal protective equipment because of the lack of engineering controls. At the Oak Ridge K-25 Site, drums of lithium hydroxide were stored in the lower level of the K-25 Process Building without proper temperature or humidity controls.

Chemical Handling Practices. Chemical handling practices at many aging facilities have not kept pace with changing regulatory requirements. (See Condition of Facilities and Safety Systems, p. 35.) As observed by the field verification team visiting Brookhaven, personnel showers in use in the Hazardous Waste Management Facility did not meet current regulatory requirements. At the Oak Ridge K-25 Site, eyewash stations and safety showers had not been installed for hazardous chemical storage facilities, and the fire protection system in Building K-25 was not properly maintained. At Los Alamos, several hundred gallons of acids and bases were stored without secondary containment at the Chemistry and Metallurgy Research Facility. At Hanford, 40-year-old stainless steel tanks containing nitric acid and aluminum nitrate were not routinely inspected for corrosion. Although these tanks are located in diked areas, release of their contents could injure workers, damage the environment, or both.

Transition of Facilities From Active Status to New Missions or to Decontamination and Decommissioning

About 1,200 DOE facilities are either awaiting or undergoing transition to deactivation.

About 1,200 DOE facilities are either awaiting or undergoing transition to deactivation and, ultimately, to new missions or D&D. Although the Department has committed to clean up and restore or dismantle these facilities, this process will probably take many years to complete. (See Figure 7 for a depiction of surplus facilities awaiting transition and the proposed transition rates for the next several years.) This transition process will include deactivation, multiple surveys, and prolonged periods of surveillance before D&D is begun. Many facilities also contain chemical inventories or house structures and equipment that are chemically contaminated, radiologically contaminated, or both. Weaknesses in the current transition process include lack of clearly understood and accepted facility ownership responsibilities, the absence of a requirement to remove chemical residues, lack of a process to retain corporate knowledge related to facility operating histories, and inadequate configuration management. These weaknesses result in an



NOTE: **Shading above curves represents facilities not yet accepted for transition.**

Figure 7. **Transition of Facilities to the Office of Environmental Management**

increased potential for exposure of workers to chemical hazards during D&D operations or while performing routine work.

Facility Ownership Responsibility. Responsibility for the cleanup and surveillance and maintenance of facilities that are no longer in use and have not been identified for transition is not clearly understood or accepted. The Office of Environmental Management (EM) recently implemented the DOE-wide Surplus Facility Inventory and Assessment Project to provide a better understanding of the scope and complexity of this transition. Through this initiative, facilities specifically accepted for D&D have been identified and prioritized for transition to EM for deactivation and cleanup on the basis of their perceived levels of chemical and radiological contamination. This effort will provide a more complete understanding of the number and type of facilities involved in the EM cleanup program and is providing the basis for a more orderly transition of facilities to EM. However, near-term responsibility for funding deactivation operations, surveillance and maintenance activities, characterization of contamination, and cleanup of the facilities that have not been specifically identified for transition is not clearly understood or accepted.

At many sites, hazardous chemicals are being stored under less-than-optimum conditions at facilities that are undergoing transition.

Presence of Chemical Residues. Many facilities either have been or will be placed in caretaker or standby status while awaiting transition to new missions or D&D, but there is no DOE or other Federal requirement to remove chemical residues from these facilities. Hazardous chemical residues have been left in the process equipment and piping of numerous facilities at **Oak** Ridge (e. g., Building K-25 at the K-25 Site, the 9201-4 Production Building at the Y-12 Plant, and the Radiochemical Development Laboratory at Oak Ridge National Laboratory). The protracted decision-making and regulatory processes for facilities in transition have also contributed to a delay in remediation of hazardous chemical residues. The inability to dispose of mixed wastes expeditiously has resulted in the retention of large quantities of hazardous materials in facilities undergoing transition. For example, a slightly contaminated solvent at Hanford could not be transported to and processed at the Idaho National Engineering Laboratory because of inconsistencies in regulatory requirements between the two States involved. At many sites, hazardous chemicals are being stored under less-than-optimum conditions at facilities that are undergoing transition. Consequently, chemical residues may exist in these structures for prolonged periods, creating an increased potential for worker exposure or environmental releases.

Corporate Knowledge. The loss of corporate knowledge with respect to the operating histories of facilities awaiting or undergoing transition could have a potentially detrimental impact on successful D&D activities. Many experienced personnel, particularly operators and “hands-on” engineers, have either transferred to other activities or retired, thereby creating information voids with respect to facility process history, presence of chemical residues, and operation of facility equipment. In most instances, no significant efforts have been made to capture this information. This situation, in turn, extends the time required for facility transition and could lead to an increased potential for exposure of workers and the environment to hazardous chemicals.

Configuration Management. Configuration management systems at many facilities have been nonexistent or have been inconsistently and incompletely implemented, Lack of effective configuration management increases the uncertainty associated with the transition process—particularly with respect to the configuration of chemically contaminated facility systems and equipment. These issues take on added significance when it is

recognized that the aging facilities most likely to be deactivated in the near future have not had effective configuration management systems and that little or no as-built information is available. For some chemical laboratories nearing the end of their operating lives, sufficient and accurate information required to effect safe facility transition is not available.

Budget Decision Making for Chemical Safety

DOE budget decision making does not provide consistent and effective budgeting and allocation of resources to support chemical safety programs. This weakness is a result of several factors. Current funding approaches used by sites make it difficult to establish comprehensive chemical safety programs; guidance and requirements for budgeting chemical safety activities are not well defined; many resource allocation decisions do not adequately consider chemical risk; and funding for maintenance of aging facilities and for facility deactivation does not receive adequate priority.

Many resource allocation decisions do not adequately consider chemical risk.

Funding Approaches. The budget approaches for chemical safety used by most field organizations do not always ensure that resources needed to implement effective chemical safety programs are identified and supported. ES&H budget allocations that provide funding for chemical safety are determined through such mechanisms as operating overhead funds to support ES&H, direct chargeback for ES&H tasks, and direct funding for special ES&H-related tasks.

Chemical safety budgets established on the basis of overhead funds are often governed more by the percentage allocation allowed and budget ceiling established than by specific chemical safety needs. Chemical safety budgets developed through this means are also subject to programmatic fluctuations unrelated to ES&H considerations. This situation is further exacerbated by the fact that the existing ES&H budgeting structure does not necessarily provide for allocation of resources to specific chemical safety initiatives, but rather allocates resources to ES&H functions that may include chemical safety. Chemical safety budgets derived from the direct chargeback for ES&H tasks are necessarily reactive to the needs of the requesting organization. Requests for support (or projections of requests

for support) are often made by personnel who are not ES&H professionals or do not have sufficient expertise to evaluate the priority of chemical safety needs versus other ES&H needs within the context of overall programmatic requirements.

Since chemical safety is not a separately funded program at DOE sites, the extent to which chemical safety initiatives are recognized and funded is often limited. This situation supports the conclusion that chemical safety initiatives do not receive adequate attention or priority from management. (See Emphasis on, Commitment to, and Implementation of Chemical Safety Programs, p. 46,)

Budget allocations for chemical safety are generally not clearly defined, which limits the effectiveness of those resources that are applied to chemical safety.

Budget Development Guidance. Limited guidance is provided by DOE Headquarters to assist local DOE and contractor management in budgeting for chemical safety or to establish its basic budgetary elements. As a result, budget allocations for chemical safety are generally not clearly defined, which limits the effectiveness of those resources available. DOE has not developed a complete and consistent set of requirements for its chemical safety program. Although DOE has begun to address this issue through development of two proposed DOE standards (DOE-STD-XXXX-YR, "Process Safety Management for Highly Hazardous Chemicals," and DOE-STD-XXXX-YR, "Analysis of Chemical Process Hazards," both dated March 1994), comprehensive chemical safety program requirements, such as those specified by DOE in manuals for radiological control, electrical safety, and hoisting and rigging, do not exist. The absence of such requirements and other regulatory drivers has led to confusion and uncertainty about the level and type of resources to be incorporated in and allocated to chemical safety.

Resource Allocation Process. At most sites, the ES&H planning and budgeting process currently in place uses risk considerations to allocate or integrate its ES&H resources. However, chemical safety programs often do not receive adequate attention commensurate with their risks, particularly when compared with those for nuclear and radiological

programs. The **DOE ES&H** management planning process is the first comprehensive effort to assemble DOE-wide ES&H budget and planning data in a single document. The ES&H Management Plan could be instrumental as a management tool ensuring that adequate funds are available to address chemical safety. By providing a means to raise identified high-risk chemical safety issues to management's attention, this system is a positive step toward improving the utilization of ES&H resources. However, evaluating relative risks and identifying priorities occur at the field level and, hence, are subject to the individual perceptions and value judgments of facility managers, who may have biases toward other safety needs. In addition, constrained budgets often result in other chemical safety needs with lower risks being left without funding, generally without consideration of partial funding options to mitigate risks.

Maintenance Funding. Funding for maintenance activities at aging facilities and for facility deactivation functions that are related to chemical safety has not been effectively addressed by DOE. Maintenance funding is hindered by the absence of a traceable, systematic, and defensible planning and budgeting system similar to that used in developing the ES&H Management Plan. Current and future maintenance budgets for many aging facilities are declining, and future budget projections indicate a continuation of this trend, suggesting that sufficient funds will not be available in the future to prevent further deterioration of these facilities. (See Management of Aging Facilities, p. 53.) In some instances, these deteriorating conditions are exacerbated by the lack of effective systems to allocate limited maintenance resources. Resources are often allocated on a perceived-risk basis and at the discretion of individual managers, rather than on the basis of actual risk. In the current constrained budget environment, support for activities that are not perceived as addressing immediate and crucial needs is difficult to obtain. The changing DOE mission has resulted in a number of facilities being placed in a caretaker status while awaiting transition to D&D; however, there is no requirement, and often no funding, to remove chemical residuals from these facilities. This problem is compounded by the fact that when a facility's mission is terminated, operating funds diminish; therefore, funds are not available to complete necessary cleanup functions before the facility is transitioned to D&D.

Current and future maintenance budgets for many aging facilities are declining.